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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/811,070

03/29/2004

Gustaaf Willem Van Der Feltz

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EXAMINER

KIM, PETER B

ART UNIT

PAPER NUMBER

2851

MAIL DATE

DELIVERY MODE

06/27/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/811,070	Applicant(s) VAN DER FELTZ ET AL.	
	Examiner Peter B. Kim	Art Unit 2851	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 May 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-19, 23, 24 and 27-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-19, 23, 24 and 27-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>5/6/2008</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after allowance or after an Office action under *Ex Parte Quayle*, 25 USPQ 74, 453 O.G. 213 (Comm'r Pat. 1935). Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR 1.114.

Applicant's submission filed on May 6, 2008 has been entered.

Remarks

After a considering the newly cited references and a review of the claims, the notice of allowability is withdrawn. The examiner regrets any inconvenience to applicant.

Regarding the Hashimoto application, applicant argues in the response of Jan. 11, 2006 that Hashimoto does not disclose measuring the second temperature. However, Hashimoto discloses the plurality of temperature sensor 2 (Fig. 1) which are used to measure the first and second temperatures of first and second regions where the first and second pattern of alignment features are formed at first and second regions (pages 16-18).

Regarding the Korean Patent Office action, the cited reference is not provided but the corresponding family of US and European documents are submitted. The US and European documents are filed after the filing of the current application, and therefore, are not prior art. Further, the reference is directed to thermal deformation of the frame and support of the apparatus and not the spatial distribution and dimensional response of a substrate.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5, 9, 13-16, 19, and 23-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Hashimoto (GB 2321316).

Hashimoto discloses a lithographic apparatus and a device manufacturing method comprising an illumination system (22), a patterning system (13), a substrate support (8), a projection system (12), a temperature measuring system (2), a calculating system (11), an adjusting system that adjusts the substrate temperature to compensate for deformation (p. 16-19). Hashimoto discloses measuring a first set of temperature corresponding to a first different region of a substrate; forming a first pattern of alignment features at first region having the measured first set of temperature; measuring a first set of spatial distribution of the first pattern; measuring a second set of temperature corresponding to a second different region; forming a second pattern of alignment features at a second region having the first set of temperature; measuring a second set of spatial distribution of the second pattern and determining a dimensional response from difference between the first and the second spatial distributions (Fig. 2, pages 16-18). Also, Hashimoto discloses temperature measure system comprising at least one sensor that measure the temperature of the substrate at each of plurality of regions across the surface, sensors distributed across the support and sensing the temperature of an adjacent region of the substrate (Fig. 1, ref. 2). Hashimoto also discloses temperature mapping system, the calculating system that develops

Art Unit: 2851

a model of the substrate (Fig. 2). Hashimoto discloses device manufacturing method and the method of establishing a model comprising emitting projection beam, imparting to the beam a pattern, supporting a substrate, projection the pattern to target portion of the substrate (p. 12, lines 13, 14 and p. 16, lines 13-17), measuring temperature of the substrate, calculating a dimensional response and adjusting the spatial characteristics, and deriving a model of the dimensional response (p. 16, line 24 - p. 19, line 5).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 13-16, 19, 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hashimoto (GB 2321316) in view of Shiraishi et al. (Shiraishi) (5,117,255).

Hashimoto discloses a lithographic apparatus and a device manufacturing method comprising an illumination system (22), a patterning system (13), a substrate support (8), a projection system (12), a temperature measuring system (2), a calculating system (11), an adjusting system that adjusts the substrate temperature to compensate for deformation (p. 16-19). Hashimoto discloses temperature measure system comprising at least one sensor that measure the temperature of the substrate at each of plurality of regions across the surface, sensors distributed across the support and sensing the temperature of an adjacent region of the substrate (Fig. 1, ref. 2). Hashimoto also discloses temperature mapping system, the calculating system that develops

Art Unit: 2851

a model of the substrate (Fig. 2). Hashimoto discloses device manufacturing method and the method of establishing a model comprising emitting projection beam, imparting to the beam a pattern, supporting a substrate, projection the pattern to target portion of the substrate (p. 12, lines 13, 14 and p. 16, lines 13-17), measuring temperature of the substrate, calculating a dimensional response and adjusting the spatial characteristics, and deriving a model of the dimensional response (p. 16, line 24 - p. 19, line 5). However, Hashimoto does not disclose adjusting spatial characteristics of the patterned beam to compensate for the dimensional response, wherein the cross-sectional shape, a position and a size of the patterned beam is adjusted. Shiraishi discloses a lithographic apparatus and a device manufacturing method comprising compensating for deformation due to temperature (col. 12, line 59 – col. 13, line 8) by adjusting spatial characteristics of the patterned beam relative to a substrate support wherein the spatial characteristic comprise a cross-sectional shape, a position, and a size of the patterned beam (Fig. 10, 11, col. 18, line 58 – col. 19, line 41). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to correct for deformation with higher overlay accuracy as taught by Shiraishi in col. 2, lines 35-59.

Claims 6-8, 17, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hashimoto in view of Shiraishi et al. (Shiraishi) as applied to claims 1 and 13 above, and further in view of Feder et al. (Feder) (2004/0012404).

The further difference between the claimed invention and the modified Hashimoto is the temperature sensor located above the substrate. Feder discloses in para 0032, the temperature sensor located above the substrate. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the temperature sensor above the substrate

Art Unit: 2851

in the invention of Hashimoto where the sensors are in a linear array extending transversely in order to accurately measure the temperature of the substrate.

Claims 16-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (6,416,913).

Suzuki discloses a lithographic apparatus and a device manufacturing method comprising an illumination system (1), a patterning system (R), a substrate support (27), a projection system (14), a sensor system (col. 11, lines 48-63) a calculating system (30, 31, 32), an adjusting system that adjusts the spatial characteristic of a size of the pattern (Fig. 6, col. 12, line 59-col. 13, line 51). Suzuki discloses measuring the first plurality of regions and a second plurality of regions and calculating dimensional response from the difference of the two regions (col. 11, lines 48-63, col. 12, line 59-col. 13, line 51). Suzuki discloses sensor system comprising at least one sensor that measure the light absorption of the substrate at each of plurality of regions across the surface, sensors distributed across the support and sensing the amount of light absorbed of an adjacent region of the reticle (Fig. 1, ref. 2). However, Suzuki does not disclose measuring the temperature of the substrate. Suzuki discloses measuring amount of the light absorbed, and since the temperature is directed related to the amount of the light absorbed and the thermal deformation of the reticle and substrate are both important to the device manufacturing method and a lithographic apparatus, it would be obvious to one of ordinary skill in the art to provide the method and apparatus for measuring the and adjusting for dimensional response of the substrate as well as the reticle and to measure the temperature of the substrate or the reticle instead of the amount of light absorbed since it is the heat that deforms the substrate.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter B. Kim whose telephone number is (571) 272-2120. The examiner can normally be reached on 9:00 AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diane Lee can be reached on (571) 272-2399. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Peter B. Kim/
Primary Examiner, Art Unit 2851

June 23, 2008